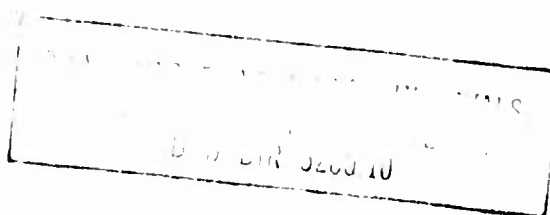


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MEMORANDUM REPORT SDC 279-3-2

TABULATION OF FAILURE REPORTS OF THE
AN/APA-56 INSTALLATION FOR PROJECT CADILLAC

New York University SDC Human Engineering Project 20-F-4
Human Engineering Project Contract N6onr-279, T.C. III
July 1950 Project Designation NR-784-006

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1. The purpose of this report is to summarize the equipment failures of the AN/APA-56 installation at the New York University Human Engineering Project at the Special Devices Center. This information is furnished in response to a letter (Aer-EL-82) from The Chief, Bureau of Aeronautics to The Commanding Officer, Special Devices Center, dated 21 June 1950, subject: Recommendations on additional spare parts for AN/APA-56(XN-1) Indicator Assembly.

2. Subject equipment has been in operation since 24 January 1950 and has accumulated some 500 hours of service since that time.

A close check has been maintained on the failures in this equipment. These failures are tabulated in the following pages according to the date of their occurrence and the number of hours of service on the gear. The nature of the failure, the unit involved, remarks on the difficulty, and the action taken are included.

This information may be in excess of that desired, but it is believed that this log of difficulties when integrated with reports from other installations will provide the Bureau with the facts upon which procurement of additional spares can be based.

TABULATION OF FAILURE REPORTS

OF THE AN/APA-56 INSTALLATION FOR PROJECT CADILLAC

<u>Hours</u>	<u>Date</u>	<u>Unit</u>	<u>Failure</u>	<u>Remarks</u>	<u>Action Taken</u>
15	1/24/50	Video Amp. AMM-266 Ser. X 7	A cold soldered joint between R-1928 & 110 V D.C.	110 V D.C. Test Jack on the front panel showed no voltage.	Joint was resoldered.
24	1/31/50	Console IP-48 Ser. X13	High voltage arc near the deflection coil of the CRT.	Arcing snap heard. Deflection coil lead too close to ground.	Deflection coil lead relocated.
25	2/ 1/50	Servo Unit PU 170 Ser. X 3	Brushes in B604 synchro were stuck.	Sweep on IP-48 console, Ser. X12 was noticed to break up in north-east quadrant.	Brushes were freed, adjusted and cleaned.
25	2/ 1/50	Console IP-48 Ser. X13	Grain of wheat bulb in cursor bearing dial was burned out.		Bulb replaced.
35	2/ 7/50	Console IP-48 Ser. X12	Resistor open.	Philco representatives gave us information that a large percentage of these resistors were from bad stock & should be replaced.	Resistor R1187 replaced. 40K cathode resistor in 3rd slewing cathode follower.
35	2/ 7/50	Console IP-48 Ser. X15	Resistor open.	Philco representatives gave us information that a large percentage of these resistors were from bad stock & should be replaced.	Resistor R1187 replaced. 40K cathode resistor in 3rd slewing cathode follower.
35	2/ 7/50	Console IP-48 Ser. X11	Tube V919 was weak.	High voltage too low.	Correct voltage reading obtained when Tube V919, 6AG7, high voltage oscillator, was replaced.

<u>Hours</u>	<u>Date</u>	<u>Unit</u>	<u>Failure</u>	<u>Remarks</u>	<u>Action Taken</u>
35	2/ 8/50	Console IP-48 Ser. X11	RA20, AIRE 101- AR Wrong focus control.	Unable to get sharp focus. No RM on IP-48 console X15.	Replace with correct part RA20, AIR 35-2AK.
35	2/ 8/50	Signal Dis- tributor J-294 Ser. X 3	Broken signal lead.	No output from Jack 4022 in Sig. Dist. J-294. No range marks on IP-48 console, X15.	Lead repaired.
35	2/ 8/50	All IP-48 Consoles	Excessive noise on scopes.	Video input level to signal distributor J-294 too low. 1.5 volts instead of 6 volts specified in manual.	Voltage was adjusted.
35	2/ 8/50	Console IP-48 Ser. X11	Resistor open.	Philco representatives gave us information that a large per- centage of these resistors were from bad stock & should be re- placed.	Resistor R1187 was re- placed. 40K cathode re- sistor in 3rd slewing cathode follower.
36	2/ 8/50	Console IP-48 Ser. X14	Bad soldered joint on the center of UG- 290U connector for cable W-4028B	No TI video.	Cable repaired.
46.8	2/10/50	Indicator Assy IP-49 Ser. X 3	Tube V-1311 weak.	Grid map not centered. Sweep line not sharply focused.	Replace tube V-1311, 6AG7 grid map vertical de- flection output amp.
46.8	2/10/50	Console IP-48 Ser. X13	Bad soldered joint.	Common ground connection for R1143, R1148, R1155, R1176, R1181, R1187.	Resoldered connection.
46.8	2/10/50	Console IP-48 Ser. X12	Tube V930 weak.	Grid map cathode follower bad.	Replace tube, V930, 6AK5.
46.8	2/10/50	Indicator Assy IP-49 Ser. X 3	The grid map focus control potentiometer was loose.	Unable to adjust focus.	Tighten nut.

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<u>Hours</u>	<u>Date</u>	<u>Unit</u>	<u>Failure</u>	<u>Remarks</u>	<u>Action Taken</u>
46.8	2/10/50	Power Supply PP 403 Ser. X 3	Fuses. Top row AC fuse bank.	Sweeps on all consoles flickering and unsteady.	Replace fuses. Subsequent fuse replacements were too frequent to permit proper tabulation.
52	2/14/50	Console IP-48 Ser. X13	Tube V906 tested weak.	Range strobe appeared at beginning and end of range strobe only.	Replace tube V906, 2C51, blocking oscillator.
50.3	2/14/50	Signal Distributor J-294 Ser. X 3	Tube V134	No 10 mile range marks on IP-48 consoles.	Replace tube, 2C51, range mark cathode follower.
50.3	2/14/50	Console IP-48 Ser. X11	Resistor R1187	Sweep not in center and not linear over the west side of the tube.	Replace R1187, 40K cathode resistor in 3rd slewing cathode follower.
71.1	2/26/50	Servo Unit PU170	Governor for S602	S602, controlled by fly-ball governor, not sufficiently depressed.	Switch removed from circuit.
102	3/7/50	Console IP-48 Ser. X13	1) Tube V925 weak. 2) Tube V922 burned out.	Sweep breaks up and too short. Not in center.	1. Replace tube V-925 6AG7, deflection amp. 2. Replace tube V-922 2C51, 2nd slewing cathode follower
144	3/16/50	Indicator Assembly IP-49 Ser. X 3	Intermittent ground of azimuth lights for PPI tube.		Scrape paint from chassis and light ring.
144.5	3/16/50	Ind. Assy. IP-49 Ser. X 3	Tube V1349	High voltage fades out.	Replace tube V-1349 6AK5, high voltage oscillator control tube.
155	3/16/50	Console IP-48 Ser. X14	Cable shorted.	Intermittent 10 mile range marks.	Repair cable.
163	3/20/50	Console IP-48 Ser. X13	1) Video gain control intermittent 2) Tube V920 weak.	Focus control not working.	1) Replace video gain control. 2) Replace tube V920 6AK5, high volt. reg.

<u>Hours</u>	<u>Date</u>	<u>Unit</u>	<u>Failure</u>	<u>Remarks</u>	<u>Action Taken</u>
170	3/21/50	Console IP-48 Ser. X11	4 desk lights burned out.		Replace 4 lights
176	3/22/50	Console IP-48 Ser. X11	2 blower motors defective.	Brushes work, carbon powder deposits excessive.	Repair and replace.
176	3/22/50	Console IP-48 Ser. X13	Tube V917 weak.	Sweep drifts in north, south direction.	Replace tube V917, 6AG7, deflection amplifier.
176	3/22/50	Console IP-48 Ser. X13	High voltage arc from cap to ground on CRT tube.	Arcing snap prominent. Picture Rewire cap. disappears for few seconds.	
179.9	3/23/50	Console IP-48 Ser. X15	Substitution synchro B902 loose brushes.	Sweep breaks up when cursor is on.	Taken apart, cleaned up and tightened.
192	3/26/50	Sig. Dis- tributor J-294 Ser. X 3	Tube V138	No 50 mile range marks output from front test jacks of J-294.	Replace Tube V138, 2C51, 50 mile range mark cathode follower.
211	3/28/50	Console IP-48 Ser. X15	Tube V945	Sweep pulls to the east.	Replace Tube V945, 6AG7, deflection amplifier.
206	3/29/50	Sig. Dis. J-294 Ser. X 3	Broken con- nection be- tween E110 & E120. Termi- nal Boards.		Resolder connection.
225	4/ 4/50	Ind. Assy. IP-49 Ser. X 3		Sweep on grid map cathode ray tube has wiggles in hori- zontal direction.	Re-adjust D.C. slew balances & sweep speed.

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Hours	Date	Unit	Failure	Remarks	Actions Taken
225	4/ 4/50	Console IP-48 Ser. X11		200 mile sweep. Takes about 1 1/4 hours to warm up to its proper length.	
225	4/ 4/50	Ind. Assy. IP-49 Ser. X 3	High voltage unit F-1325 exhibited poor stability.	The brilliance indication on both cathode ray tubes showed a slowly decreasing DC output from the high voltage unit as a function of time. Oil was found to be leaking rapidly from the high voltage unit.	High voltage unit F-1325 replaced. Spare unit had slight leak when removed from packing.
260	4/13/50	Console IP-48 Ser. X15	Tube V903 weak.	Range strobe and range delay intermittent.	Replace Tube V903, 2C51, phantastron cathode follower.
264.7	4/14/50	Power Supply PP-403 Ser. X 3	Blower motor filter burned out.	When equipment was started smoke was seen. Subsequent examination revealed that the blower motor filter was burned out.	Blower motor filter was replaced.
264	4/14/50	Ind. Assy. IP-49 Ser. X 3	V-1336 Tube	Grid map center east-west too far to the east.	Replace Tube V-1336, 2C51 grid map 1st slewing cathode follower.
264	4/14/50	Ind. Assy. IP-49 Ser. X 3	Tube V-1328 is weak.	PPI sweeps from the south and does not extend north past center of the CRT.	Replace Tube V-1328, 6AG7, PPI deflection output amplifier.
277	5/ 8/50	Sig. Dist. J-294 Ser. X 3	Tube V-144 was dead.	50 mile range marks on all consoles were duplicated in range.	Replace Tube V-144, 2C51, blocking oscillator.
277	5/ 8/50	Sig. Dist. J-294 Ser. X 3	Tube V-119 intermittent short.	Targets duplicated in range on all five IP-48 consoles.	Tube V-119, 6AK5, radar mixer replaced.

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<u>Hours</u>	<u>Date</u>	<u>Unit</u>	<u>Failure</u>	<u>Remarks</u>	<u>Action Taken</u>
280	5/ 8/50	Power Supply PP-403 Ser. X 3	V-719 failed.	Range strobe disappears when cranked to a range greater than 5 to 10 miles on all consoles. Targets intermittent on 3 consoles. Angle marks, range marks & grid map still displayed on these intermittent consoles. Video signal normal at Jack 923, the grid of cathode ray tube. The 3 intermittent consoles are sensitive to vibration, not simultaneously intermittent.	V719, 3B25, replaced.
293	5/10/50	Console IP-48 Ser. X15	2 lamps on slew dial light intermittent.	This condition is due to poor contact between the lamp base and the spade lug spring contact. It appears impossible to conveniently restore the spring tension of the spade lugs.	Ordered silver plated washers to raise the contact surface of the lamp for better contact.
311	5/15/50	Console IP-48 Ser. X15	Tube V-903 failed.	Strobe and sweep delay out.	Replace Tube V-903 phantasticon cathode follower.
320.8	5/16/50	Servo Unit PU-170 Ser. X 3	2 screws omitted from coupling B610 drive motor.	No sweeps on any IP-48 consoles, inputs proper.	Proper screws installed.
330.1	5/18/50	Console IP-48 Ser. X11	Solder joint failed between R-1135 & R-1133 & R-1136.	Brilliance intermittent on sweep.	Joint resoldered.
391.3	6/ 1/50	Console IP-48 Ser. X14	High voltage arc.	Arcing snap heard. Subsequent temporary loss of picture.	Plate cap of cathode ray tube rewired.

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<u>Hours</u>	<u>Date</u>	<u>Unit</u>	<u>Failure</u>	<u>Remarks</u>	<u>Action Taken</u>
439	6/13/50	Console IP-48 Ser. X14	Tube V-925 failed.	Sweep shortened in north direction.	Tube V-925, 6AG7 de- flection amplifier, re- placed.
446	6/14/50	Console IP-48 Ser. X14	Tube V-922 failed.	Sweep center south & sweep distorted.	Replace Tube V-922, 2C51, 2nd slewing cathode follower.
470.3	7/12/50	Console IP-48 Ser. X15	Bakelite con- tact holder broken in PPI lighting assy.	No edge lighting of plexi- glass plotting surface.	New part fabricated and inserted.
474.3	7/12/50	Power Supply PP-404 Ser. X 3	Transformer T-801 leaked tar excessively.	No sweeps on any IP-48 con- soles. Large defocused blob on all consoles.	Under investigation.
474.3	7/12/50	Console IP-48 Ser. X13	Bakelite con- tact holder broken in PPI lighting assy.	No edge lighting of plexi- glass plotting surface.	Parts being fabricated.

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